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THE NATURE OF THE CLOUDS OF VENUS  
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The clouds of Venus are composed of a material of low refractive index, high single scattering albedo in the visible and near infrared, high ratio of forward to backward scattering in the visible and near infrared, low absorption coefficient in the visible and infrared, and high absorption coefficient beyond about  $3\mu$ . Water possesses all these properties, but the clouds of Venus are not water, because the vapor pressure of water at the temperature of the clouds of Venus is so large that much more water vapor would have been discovered spectroscopically than is actually the case. In addition, there is some likelihood that the clouds of Venus absorb in the blue, violet, and ultraviolet.

The low index of refraction,  $n < \text{about } 1.4$ , is very restrictive, as a glance at Lang's "Handbook of Chemistry" will demonstrate. The absorption characteristics are reasonable for a wide variety of materials. But the index of refraction restriction eliminates most likely inorganic solids and crystals, and suggests organic compounds. An organic substance has the advantage that it may be produced directly from the carbon dioxide, water, and nitrogen of the Cytherean atmosphere. The most natural such material would seem to be aldehydes or their polymers, as Rupert Wildt realized in his papers (1940; 1942) in the Astrophysical Journal. The aldehydes and ketones are the most likely organic molecules with strong absorption at short visible wavelengths. Formaldehyde itself has been searched for unsuccessfully by Wildt and by Spinrad. The vapor pressure of formaldehyde above its polymer<sup>paraformaldehyde</sup> may, however, be less than the limit of detectability of these observers. The acetaldehyde polymers metaldehyde and paraldehyde should have even lower vapor pressures. We know that formaldehyde should be produced in the Cytherean atmosphere, and further experiments along these lines can be performed.

What is the microwave spectra of the aldehydes? Can they possibly be related to the lines around 1 cm which Frank Drake is seeing? Note that both Wildt and Kaplan, from entirely different lines of evidence, have come to the conclusion that the clouds should be organics or aldehydes.